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ABSTRACT

The desirability of teaching usable knowledge in terms of inert knowledge is presented. A review of the literature covering knowledge structures, knowledge processes, and the link between knowledge and social interaction concludes with an outline of a tentative model of the knowledge system. Implications for second language instruction are also offered. It is suggested that inert knowledge in second language instruction can be linked to at least three sources: absence of authentic experiences; inaccessibility to knowledge; and apathy in the sense of a lack of self-initiated goals. For students to develop usable knowledge, they must have classes that are complex and open, and that direct students to other complex, open experiences. Contains 38 references. (LB)

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Schemata, Strategies, and Social Construction: Some Implications for Second Language Pedagogy

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The desirability of teaching usable knowledge vis-a-vis inert knowledge is presented. A review of the literature discussing knowledge structures, knowledge processes, and the link between knowledge and social interaction concludes with an outline of a tentative model of the knowledge system. Implications for second language instruction are also offered.

This paper raises the issue of inert knowledge in second language education. A Review of recent theory and research on schemata, strategies, and social construction, which discuss how knowledge is represented and processed both cognitively and in social interactions, suggests how second language classes can avoid inert knowledge and facilitate the acquisition of usable knowledge.

I remember well how, when I began teaching, I was surprised at the gap between my students' performance on my fill-in-the-blank tests, which was generally very good, and their performance in conversation and composition, which was generally quite poor. For a while, I rationalized these differences as a natural part of the learning process, as control in a limited domain preceding control in a more complex domain. However, when I began to see students who had 600+ TOEFL scores and who could hardly write a grammatical sentence in an essay, my doubts began to grow. At first I thought of this phenomena as ritual learning or pseudo-language, but recently I have found an existing term in the literature which describes it fairly well, inert knowledge (Whitehead, 1929).

McNeil (1986) tells a story which illustrates inert knowledge quite well. During her ethnographic study of social studies curricula in high schools, she observed a class where knowledge had been reduced to a simple exchange in which minimal cooperation from the students was rewarded by acceptable grades from the teacher. The school was not bad by conventional standards: students scored high on tests. However, after observing a six-week unit on the Great Depression, McNeil interviewed all of the students. One of her questions was: Have you ever studied poverty in this class? Not one student said yes. Whether for McNeil's high school students or the international students with the 600+ TOEFL scores, inert knowledge is knowledge that is isolated, fragmented, and demonstrable only in specific, limited situations. And again in both cases, there

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appears to be a relationship between the inert knowledge of the students and the educational practices of their teachers and schools.

If we want to avoid inert knowledge and encourage the acquisition of knowledge that can be used for communication, we should first consider the general question of knowledge. By knowledge, I mean to include any kind of mental representation. Knowledge is used here more broadly than is usual to refer to current perceptions and thoughts; memories of people, events, and places; expectations; recalled or constructed imagery; your beliefs and emotional evaluations; procedural knowledge of all kinds; whatever is represented in your mind.

How knowledge is represented in the mind has received a great deal of attention in the last two decades. A number of terms have been proposed to describe knowledge representations: frame (Minsky, 1975); script, plan, theme, and goal (Schank & Abelson, 1977), schemata (Rumelhart, 1975); prototype (Rosch, 1978); mental model (Johnson-Laird, 1983); knowledge structures (Abelson & Black, 1986); person, role, event, self-, and non-content procedural schematas (Fiske and Taylor, 1984); and, propositional and image schematas and idealized cognitive models (Lakoff,1987). This long list is not exhaustive, but the profusion of terms suggests both the amount of work being done in this area and the lack of consensus. The purpose of this paper is to examine some broad trends in the research and theory addressing issues of the representation and use of knowledge and then to reflect on some of the implications of the research for second language education, particularly focusing on what the research may suggest about how to develop usable rather than inert knowledge.

SCHEMATA: THE STRUCTURE OF STORED KNOWLEDGE

The basic idea of a schema and of many other forms of knowledge representations is that memory is structured, organized, not random. A schema, therefore, is a memory structure. The implication of this idea in communication is that schemata (the memories or prior knowledge a person has stored) shape our perception, interpretation and production of texts (whether they be written, spoken, visual, tactile or whatever). Recognizing that we use schemata has led to a radical reappraisal of comprehension as an active process of constructing representations and meanings rather than as a passive process of decoding signals. I will begin with two trends in the study of schemata.

The first trend in the research relates to a theory of memory storage (Tulving, 1972), which posited two memory systems, semantic memory and episodic memory. Semantic memory is for storage of decontextualized information (e.g. Washington is the capital of the U.S.; $E=mc^2$; The Great Depression followed the collapse of the stock market). Episodic memory is for the storage of personally-experienced, contextualized events (e.g., your memory of a meeting you attended this week). In the 1970s research on knowledge representations tended to focus primarily on the kind of abstract, general knowledge (scripts, text

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schemata, concepts) that would be located in semantic memory. For example, Schank and Abelson's (1977) idea of scripts as abstract decontextualized schemata of typical events in certain settings would probably fit the notion of semantic memory. Their most famous illustration is the restaurant script. For example, read the following sentences:

> *Last night we went to a restaurant that our friends told us was the best in town. However, we were really surprised when the food arrived: it was not what we ordered and, when we complained, the waiter was quite rude.*

When you read this short narrative, you must draw on your prior knowledge of what a visit to a restaurant is like in order to construct a meaningful interpretation. You have almost certainly inferred several things. For example, you have probably inferred that the people sat down to eat (good restaurants usually aren't carry out), that a waiter took the order and then brought it to the table, that the people were surprised because the service was less than they expected. While none of these points is explicitly stated in the text, our knowledge (or schemata) for restaurants leads us to infer these points. In technical terms, the text instantiates a restaurant schema (or script), and the schema then leads to certain inferences being made. A script is an abstract, decontextualized event schema. The restaurant script includes generalized information about typical participants, settings, and events, but not any information about particular restaurants or particular visits to a restaurant. Similarly, text structure knowledge (Mandler, 1978; Meyers, 1975), conceived as abstract, structural outlines of texts resembling tree-diagrams for sentences, would seem to fit into semantic memory.

In the 1980s research began turning more and more to episodic rather than semantic memory structures. This shift can be seen clearly in the changes within researchers. For example, in 1982 Schank revised his and Abelson's 1977 version of scripts as abstract, semantic memory structures to a view of scripts as episodic memory structures, reflecting his perception of the priority of episodic, particular knowledge. Discussing why he changed his views of scripts, Schank (1982) observes:

> *Part of the justification for this modification of our old view of scripts is that it really is not possible to say* exactly *what is and what is not part of any script. Particular experiences invade our attempts to make generalizations. To put this another way, we do not believe in the script as a kind of semantic memory data structure, apart from living breathing episodic memories. What we know of restaurants is compiled from a multitude of experiences with them and these experiences are stored with what we have compiled. (p. 23)*

Van Dijk and Kintsch (1983) make much the same point, noting that the notion of fixed, semantic memory structures (like scripts) simply cannot explain the flexible nature of cognitive functioning.

The second noticeable trend in research relates to the range of phenomena studied as schemata rather than to the memory system involved. Research in the 1970s tended to focus on a few abstract concepts (like scripts for restaurants, categorical prototypes for birds, and text structures for stories). In the 1980s, schemata became the focus of other areas of psychology, particularly of social cognition. For example, two social psychologists, Fiske and Taylor (1984), identify five types of social schemata: 1) person schemata, information about the goals, traits, and behaviors of typical and particular people; 2) self-schemata, information about your own goals, emotions, behaviors, etc.; 3) role schemata, information about characteristics, norms, behaviors and so on of groups defined by categories (e.g., age, sex, occupation, class, religion); 4) event schemata, knowledge of what happens in typical or particular social occasions; and 5) procedural social schemata, rules for linking or processing information from the above four (e.g. attribution processes to determine causes of people's behavior). The content of this list also reflects the first trend toward more episodic memory; person schemata, for example, include not just your general models of personality traits, such as shyness, but also your memories of your Uncle Buck and your models (generated from those memories and from other knowledge) of what kinds of behavior you can expect from him.

The two trends together illustrate first that the idea of schemata has changed. Whereas originally a schema seemed to be conceptualized as an abstract, generalized knowledge structure, today it is generally synonymous with memories of any kind. In fact, attitudes, goals, images, beliefs, and affective evaluations are included among the types of knowledge discussed as schemata. Second, these trends illustrate a shift in the relative importance given to abstract knowledge. Today episodic memory is widely viewed as more central to knowledge processing: structures like scripts are now seen not as preexisting structures that direct cognition, but rather as temporary products constructed out of episodic memories.

STRATEGIES: THE PROCESSES WHICH CONSTRUCT KNOWLEDGE

The knowledge structures discussed above are representations of prior knowledge: they are stored information. To be of use, stored knowledge needs to be called up and integrated with current thoughts, perceptions and goals. Thus, several researchers have recognized the need for current, "on-line" representations of knowledge. Johnson-Laird (1983) suggests that such mental models (constructed, analogical representations of the world and/or discourse) are needed

to explain reasoning. Mental models are constructed to represent the worlds of our experience or of our hypothetical worlds. For example, your current mental model may include information about your present bodily state and position, perceptions of your physical and social environment, your current understanding of and reaction to this article, some (perhaps conflicting) representations of your needs and desires, and various other thoughts and images. Elements of these mental models will be stored in your memory as new schemata or be used to modify existing schemata. Van Dijk and Kintsch (1983) introduce two types of mental models, situation models and communicative context models, as components in their theory of discourse comprehension. In any case, these cognitive models in the brain arise out of the interaction of prior knowledge, sensory input, and current goals.

Of course, if you are generating models in your mind (of this text for instance), you need to have some rules or strategies internalized to do so. Van Dijk and Kintsch argue that discourse comprehension is a strategic process, highlighting the role of knowledge *processes* (strategies) as well as knowledge *structures*. By strategies, they mean to include all cognitive processes, from the kind of conscious strategies we might employ to get jobs (e.g., dress well) to nonconscious processes you are using to search for schemata relevant to this text as you read it. Van Dijk (1987) explains the strategic view of processing as follows:

> *. . . understanding is gradual, on-line, often makes use of incomplete information, requires data from several discourse levels and from the communicative context, and is controlled by individually variable goals and beliefs. (p.165)*

Schank (1982) made a similar move in his theory. When he reconceptualized scripts as essentially episodic memory structures, he introduced two new terms, memory organization packets (MOPS) and thematic organizations points (TOPS), as more general than scripts. However, he argues that these abstract "structures" are used to access and interrelate episodes. In other words, his high-level knowledge structures (MOPS and TOPS) are actually knowledge processes. In this sense, the distinction between schemata and strategies may be functional. Stored procedural knowledge (schemata) when in use may function as strategies.

Strategy, used in the sense of van Dijk and Kintsch (1983), is a term to describe cognitive processes. While many descriptions of discourse assume, following Chomsky, that language comprehension and production are *rule-governed* phenomena, van Dijk and Kintsch argue that cognitive processes are more open-ended and have more variable results than rules would allow. Thus, they chose the term strategy to contrast with the notion of rule. Their use of strategy, which I follow in this paper, is very different from and much broader than the common usage in the second language literature of the term "strategies", defined as specific behaviors that a person employs to learn a language or to maintain and repair communication.

What is important to understand here and what we will come back to as we talk about instructional implications is that the strategies or processes contemplated in these current models of comprehension are active, not passive, and are not just global cognitive processes that we inherit as members of our species. The strategies represent operations occurring at many different levels of processing with varying degrees of generality. Some might be domain specific, such as how to evaluate a statistical procedure. Others might be quite general, such as assuming that remarks are relevant to the topic (Grice, 1975). To say that strategies are active means that they are involved not just in comprehension processes, but also in production, that they guide not only how we reach a goal, but also what goals we pursue.

SOCIAL CONSTRUCTION: ANOTHER PERSPECTIVE ON KNOWLEDGE

Prior knowledge structures, mental models and strategic processes remain in the cognitive domain, located within the individual. Studies of the social nature of learning and discourse are beginning to suggest another picture of knowledge. Vygotsky (1962) argues that language and knowledge result from a process whereby social interactions are internalized and that learning occurs through the *zone of proximal development* (the performance that an individual can reach with the help of others). Cazden (1983) discusses how vertical structuring of interaction (e.g., scaffolds) leads to learning. The vertical structures she discusses are ones in which adults provide cues, clues or even some answers to help children communicate a message or solve a problem. Similarly, Daiute and Dalton (1988) in their study of collaborative student writing suggest that cognitive conflict and play during peer interactions may be central to cognitive development. For example, consider the following interaction between two fourth or fifth graders collaborating on writing a story:

> A: And he flew off into the Atlantic Ocean
>
> B: The Atlantic?
>
> A: Yeah, the Atlantic.
>
> B: No, into the Pacific . . . he swam for a couple of hundred miles (Daiute & Dalton, 1988, p. 265).

What happens in this interaction is clearly not the kind of tutoring usually found when the zone of proximal development or scaffolding are discussed. But these kinds of interactions may be the basis for strategies like word play or, more centrally, elaboration. Studies of interactions like scaffolds and of the role of cogni-

tive conflict suggest that knowledge may be formed interpsychologically, that knowledge may be viewed as something accomplished within social interaction. This contrasts with our normal picture of communication in which I have a message that travels through a medium to you who receive it and respond to it. The picture here is one in which significant elements of the message are emerging through the medium of our interaction, more between us than within us.

The notion of the zone of proximal development (Vygotsky, 1962) says that learning occurs when you are asked to perform beyond your current level of ability. At first this might sound a lot like Krashen's (1981) $i + 1$ formulation of input for second language acquisition. However, the essence of the zone of proximal development is not input, it is interaction. While input is conceived as data to stimulate the emergence of a particular *grammar* out of our genetically-inherited universal grammar, the zone of proximal development conceives of learning as the constructive internalization of social structures and processes. If we return to our discussion of strategies, a Vygotskyan interpretation of much of what van Dijk and Kintsch (1983) label as strategies would be that the strategies are products of internalized sociohistorical interactions.

Current research in composition suggests that you may even internalize the learning-through-interaction process itself. Recent composition theories which view writing as a process of discovery and learning (Knoblauch and Brannon, 1984) imply the notion that externalizing and attempting to communicate thoughts in writing can provide a kind of self-generated scaffolding which leads to the refinement of thought and to the creation of new meaning. McGinley (1989) suggests that the self-directed, recursive reading and writing his subjects employed in a writing task amounted to the individual creating a "vicarious community." In other words, he argued that his subjects, who sat alone in a room reading and writing and then rereading and revising, were creating over time a dialogue within themselves, and between themselves and their texts, as they composed their essays.

Another perspective on the social nature of knowledge can be seen in the notion of intertextuality (Derrida, 1974). Porter (1986) gives as an example of intertextuality the Pepsi commercial which evokes images of rural, Depression-era America and of Spielberg's movie *Close Encounters of the Third Kind*. The commercial is constructed out of prior texts. Intertextuality theory argues that all texts are necessarily constructed and interpreted out of bits and pieces taken from previous texts. The pieces may range from the use of individual words to strings of words, from patterns of style and structure to world views. For example, consider the word "text". When I read this, I do not understand it by consulting an internal dictionary definition. The word carries traces of how I have read or heard it used. For example, it first evokes a sense of authorized knowledge, an object of study, through its use in textbooks. It also evokes connections with specific disciplines, English and Linguistics. For a long time, when I saw "text", I thought only of written text. As I began to read more discourse studies, I saw text being used for oral as well as written discourse. More recently, reading

Freire (Freire and Macedo, 1987), I have come into contact with the ideas of the world as text and reading the world. Words do not stand alone; they carry traces of the environments they have been used in. Texts do not stand alone either: they are written and read through relations to previous texts.

What connects intertextuality and the zone of proximal development with the earlier discussion of trends in schema research is that these concepts suggest that knowledge structures and strategies are acquired through cumulative processes of internalizing experience in social environments, which are in turn the products of history. Native speakers of a language have few, if any, scripts without episodes. The meaning and use of words arise out of multiple texts and contexts, not formal dictionary definitions. In this view, the particular and the episodic emerge as the continuing ground of the abstract and the general. And the particular and the episodic are firmly anchored in sociohistoric circumstance.

A TENTATIVE MODEL OF THE KNOWLEDGE SYSTEM

What should be clear from the discussion above is that discourse (comprehension and production, written and spoken) is based on a complex knowledge system. I would like to offer one view of that system, based in large part on my interpretation and extension of van Dijk and Kintsch's (1983) model of discourse comprehension. This adapted system has five components. First is stored, prior knowledge (schemata). Prior knowledge may be viewed from two perspectives, as knowledge structures (the cognitive perspective) or as intertext (the social perspective). Second is what I will call emergent knowledge (mental models). Emergent knowledge refers to the on-line creation of meaning and to the discovery/construction of new meaning. It too may be seen as arising from internal cognitive processes or social interactions. Third is strategies, processes which construct knowledge. Again, strategies may be viewed as cognitive (e.g., patterns for generating scripts out of episodic memories) or social (e.g., scaffolding). Fourth is a control system. The idea of a control system or executive processes is one of the least developed areas. However, a control system seems to be needed to coordinate the selection of goals and strategies. The control system is generally not seen as a "ghost in the machine," but rather as a reflection or product of current cognitive processes. An important part of the control system would be goals, many of which may be schemata or strategies. Fifth is overall arousal and emotion, which have not been mentioned. Arousal and emotion are global states like hunger, tiredness, anxiety, drunkenness, and so on. If I write "Ronald Reagan", you will probably experience some affective reaction. That affective reaction can be seen as a stored memory, as part of a schemata. However, if you have an automobile accident, the resulting adrenaline rush and other physical effects will have global effects on your mental processes.

INERT KNOWLEDGE AND KNOWLEDGE TRANSFER

Most accounts of schema theories in reading comprehension, emphasize prior knowledge. Discussion of the role of strategies (as used here) is not central. The danger of schema theory as it is often presented is that it could be construed as arguing for a passive, banking model of education (Freire, 1970), where our role as teachers is to deposit lots of knowledge in our students' brains. This kind of rationale underlies Hirsch's (1987) concept of cultural literacy, a concept which reduces education to a kind of preparation for trivial pursuits.

One of the problems with theories of knowledge deposit is that they take retrieval and transfer for granted. Schacter (1990) notes that one of the major findings of memory research in the past decade has been that the value of particular activities for encoding depends on the conditions under which information is retrieved: "Encoding operations that lead to high levels of memory performance under one set of conditions may lead to low levels of performance under different retrieval conditions" (p. 690).

The difference between ESL students' performance on discrete-item grammar tests and that in actual conversations provides striking evidence of this. The students I discussed at the beginning of this paper had encoded language knowledge (through exercises) in conditions that replicated the retrieval conditions (the test). However, they could not access and use their language knowledge in other conditions. In other words, it was inert knowledge, knowledge that had been deposited but could not be withdrawn for use outside the bank.

Spiro et al. (1987) make a similar point in their study of transfer (the ability to apply knowledge learned in one context to other situations or tasks). They found that when social studies information was presented within clearly organized frames (i.e., under conceptual titles) it was recalled better than the same information presented in an ill-structured fashion (i.e., without conceptual titles). However, when a given second task requiring the transference of information to new settings, the group that had received the ill-structured presentation did better than the group receiving the well-structured presentation. Spiro,et al. (1987) suggest that if you want knowledge to transfer in natural settings, then the knowledge representations should have the following features: "multiple interconnectedness between different aspects of domain knowledge, multidimensional or multiperspectival representation of examples/cases, and allowance for various forms of naturally occurring complexity and irregularity" (p.178). Thus, they argue, what is needed is "cognitive flexibility." Concluding a discussion of the misconceptions caused by single analogies in learning complex concepts, Spiro et al. (1989) argue:

> *. . . the maladaptive force of single analogies is paralleled by misconception-inducing reductive forces of a single schema, single mode of organization, single line of argument, single precedent example, single prefigurative "world view," and so on. The antidote for these maladaptive forces of simplification is in each case the* systematic assembly of multiple knowledge sources*—integrated multiple analogies, compiled fragments from diverse schemata, re-presentations of the same information under different organizational schemes, multilinear lines of argument, and multiple precedent examples. (pp. 529-30)*

In other words, if you want to prepare your students for job interviews, do not just give them a set of rules, a sample of an application form, and a single dialogue or simulation. Give them multiple examples of interviews or simulations of interviews with different emphases, different tasks and different affective tones. Give them multiple samples of application forms. Have them read or better yet do research on issues like discrimination, drug-testing, the use of lie-detector tests, and the use of psychological tests. Give them different, possibly conflicting, sets of rules. It is important to recognize how far this prescription is from an educational mainstream in which standardized tests are central to research and practice. Good performance on standardized tests basically demonstrates inert knowledge; thus, research on teacher effectiveness, which has generally used standardized tests as criteria, tend to result in models for how to develop inert knowledge. To develop inert knowledge, you reverse all of Spiro et al.'s recommendations and limit instruction to single sources of and contexts for knowledge.

GENERAL IMPLICATIONS FOR SECOND LANGUAGE INSTRUCTION

I will take it as a given that the primary goal of language education is to produce *usable* knowledge rather than inert knowledge. For most teachers, the goal is probably framed as communicative competence or proficiency. However, Pierce (1989) suggests a critical pedagogy of possibility which challenges the given rather than accepting it. One of the central implications of the research discussed above is something we have supposedly already learned in second language education. If you want students to learn how to do something, they need to do it. The centerpiece of communicative language methodology has been that, if you want students to be able to communicate in a second language, then they must use the language for communication. However, the discussion of knowledge above has several implications for how we understand communication which has been unevenly recognized in second language theory and practice.

There were five terms in the tentative model of the knowledge system given above: prior knowledge, emergent knowledge, strategies, control processes, and arousal. I will focus here primarily on the implications relating to three of those terms: prior knowledge, strategies and control. First, students need prior knowledge. We can no longer conceive of ourselves as just language teachers. Language is only a code; communication requires meaning and meaning arises from our knowledge of the world in the broadest sense. Language is not, as we have learned, a rule-governed phenomena: it is a knowledge-guided one, with all types of knowledge involved. Carrell (1988) has suggested that every second language program needs to have a parallel program for content knowledge acquisition. Prior knowledge includes almost every category of knowledge you can think of. For example, consider a classroom interaction in a university where the professor is talking. Prior knowledge here might include not just knowledge related to the content and structure of the lecture, but social knowledge. For example, what do the professor's dress, jokes, choice of words indicate about her political and social affiliations. Not understanding the political and social affiliations and values of the source of a message is often a serious impediment to understanding the content of the message. Recalling Freire (1970) and Spiro et al. (1989), we need to be careful not to model the content component of our curriculum after the inadequate, but common models found in many subject classrooms. We should encourage students to be active users and pursuers of knowledge, to integrate knowledge both across domains and with their own lived experience. I do not believe that the kind of content knowledge acquisition Carrell (1988) calls for requires every student to study the same material in the same manner.

Second, students need strategies. As discussed above, when we think of strategies in ESL today, we probably think of learning strategies or of repair strategies for communication breakdowns. However, strategies in the sense they are being used here are much broader. They may be conscious or nonconscious (tacit). Many of them may be domain-specific. For example, consider the strategies involved in evaluating a statistical argument. You will have certain visual strategies for scanning tabular information, a variety of linguistic and discourse strategies for reading and making sense of the text. You will have some domain-specific strategies for evaluating statisticsm, depending on your prior knowledge. For example, you may have a map of the statistical landscape, of special topics to consider, such as randomization, size of sample, category of data in relation to statistic used, and so on. You may recall images of a particular class you attended or of pages from a statistics book or from class notes. You will also have strategies (goals) that identify your purposes for doing the evaluation. If you have a tendency for math anxiety or you have not gotten much sleep, you might also have self-regulatory strategies to control your arousal. All of the strategies mentioned here probably barely scratch the surface of the strategies actually used in evaluating the argument. Furthermore, research in social construction suggests that these cognitive strategies are acquired through constructively internalizing elements of social interactions. This view of strategies argues for authen-

ticity in materials and activities, for close simulation of target activities (or the actual activities themselves), so that the specific strategies involved (most of which we will not be aware of) may be acquired.

Third, students need to possess an appropriate control system for the tasks they undertake; they need the appropriate goal strategies/schemata. Communication normally involves self-initiation (our own goal-seeking acts). In addition to strategies of text comprehension, van Dijk and Kintsch (1983) discuss strategies for controlling the discourse comprehension process itself. For example, in discussing the strategies employed in reading a *Newsweek* article, they point out that they assume a general sociocultural strategy (goal) of getting political information. This raises an important point. If students' actions are always initiated by the teacher (are externally motivated), and the activity being taught presumes internal motivation, then the students may end up without this first central component of usable knowledge: a set of goals, the desire to do something. Perhaps an example of this is the statistics courses required of many students in education. They take statistics and leave the program with inert knowledge. Statistics comes out when a test initiates it, but students have not developed goals for using statistics. Schank (1982) talks about the central script being the personal script, a kind of self-schema which tells you what kind of things you do during your day. If statistics is not incorporated into your personal script, then have you learned statistics? Smith (1982) talks about all learning occurring through a process of apprenticeship in what he likens to "clubs". For example, he argues that kids decide that they are members of the "literacy club". You could say here that reading and writing get incorporated into the child's personal script. Smith also notes how "slow" learners, confronted with more and more decontextualized, nonsense worksheets which are supposed to "remedy" their deficits, come to the logical conclusion that reading is not meaningful. In a common social process, rejected by the literacy club, they reject the club and form a social identity in resistance to it. In Schank's terms, we could say they exclude reading from their personal script.

REFLECTIONS ON CLASSROOM PRACTICE

Considering the role of particular episodic knowledge structures of all kinds and the need for strategies of many types and levels, we are faced with a dilemma. How can we know what to teach? Specification of what to teach is still commonly assumed to be the first step in planning language instruction. I would argue that in principle we cannot specify what students need to know because the number of items is practically infinite and because we are not now even close to specifying, for example, all of the strategic processes involved in reading a simple sentence like this one. However, there is another route. We do not know what we know, but we know how we acquire it: experience. A basic principle that should guide our instructional activities is consideration of what

experiential base a native would bring to a situation and then inclusion of activities that simulate or actually replicate those experiences as much as possible. Concern with experience requires consideration of how experience is internally perceived and processed, as well as the external circumstances that surround it. If three people go to a movie and one sleeps while the second watches for entertainment and the third carefully studies it for its reflections of popular culture, their experiences of the movie will be very different, as will what they have learned from it.

Let's consider two examples of what simulating target activities might mean, one academic and one non-academic. First, say that you want your secondary ESL students to be prepared for academic work and that you conclude that part of being ready for academic work means knowing how to take short-answer examinations. Since the supposition is that successful students have gone through experiences that have prepared them for taking such exams, your task is to provide contexts for the ESL students to learn similar lessons. The most obvious preparation is prior tests of this type. The most accurate way to simulate such tests is to give content instruction over, at least, several days on some topic and then to give a short-answer test on the material covered. Why should the content lesson last several days and not just 30 minutes? The reasoning behind this is, if you want to simulate actual academic classes, the amount of material and the time factor may well be important, may call on different cognitive resources (more synthesis needed for example) and may call on different study modes. Taking a test immediately after a 30-minute lecture might not contribute to the development of needed strategies and control processes.

What will happen from this kind of exercise? From my experience with university-level ESL, I suggest several kinds of problems that frequently emerge. First, students will often not understand the stated questions, so their answers will not cover the material called for. This may be because they do not understand vocabulary or some element of grammar in the questions or for more complex reasons relating to the content. In any case, students are often unaware that they do not understand the stated questions; this alone is important. Strategies (used now in the ESL sense of the term) for requesting information about the meaning of the question during a test may be useful here. Second, students may not understand the unstated expectations of a question. For isntance, faced with half a page of blank space and the question "Do you think theory x is better than theory y?", a student may respond with a mere "Yes." Or more subtly, when asked a question that calls for personal opinion, a student may give an opinion without making any reference to the material covered in the course. Third, students may have problems due to their way of studying the material. For example, a student may simply read an article over and over again, memorizing the information, and then be confused by a question which assumes the information and asks for its synthesis or application.

The point is that by going through actual or closely simulated experiences, the ESL student will have opportunities to develop the kinds of knowledge and

strategies (in van Dijk and Kintsch's sense) that they need to be successful in their academic work. I should add that I would make this activity an actual test in the ESL class and not consider it just as practice. In this case, part of the actual exam context is that it is externally motivated and that feedback comes in the form of a system of rewards or penalties. Actual grading of the test also makes it more likely that the common "arguing-with-the-question" scene will take place after the tests are returned.

A non-academic example might be baseball. If you decide or your students decide that they should learn about baseball, then the simulation of experience principle would suggest that students first should actually play baseball, go to baseball games, and watch baseball on TV. In addition, students could read the sports pages and find out how to interpret the various tables of information given on games or summarizing individual and team statistics. They may also collect baseball cards and watch movies that deal with baseball (e.g., the recent *Field of Dreams*).

Several points need to be brought up here. First, you need to base the instructional experiences roughly on the kind of experiences that native speakers might have in acquiring the knowledge in question. Second, time is an important factor. Obviously you cannot spend as much time on baseball under the auspices of an ESL class as a native speaker interested in baseball would spend. On the other hand, this is clearly not a one-day lesson. Experience takes time. An experiential approach to ESL suggests a thematic organization in which students spend significant amounts of time focused on some topic or task. Third, unlike essay exams, baseball is normally not graded and is followed according to the interest of the individual. As the discussion of the importance of the control system section suggests, this may be a central point. It may suggest that students work on individual or small group projects they have selected with whole class structures related to sharing their findings. This kind of structure is already found in whole language approaches such as Sustained Silent Reading (SSR) programs, where students individually select books to read during a "shared" reading period.

The above examples suggest how classes could be structured once we decide what to teach, but the question of what to teach, as I mentioned above, is more difficult. Imagine a social studies essay exam that looks like the following:

> *Considering the various positions we have discussed, respond to the following argument: Baseball teams should be run democratically.*

The point is that discussions of or tests on specialized academic knowledge often make use of some aspect of general cultural knowledge that the educator assumes is shared. Baseball may no longer be one of those contexts since its male-oriented nature is clear, but some aspects of general culture will carry over into specialized studies. What aspects carry over is not predictable, except that they rep-

resent something that someone assumes is a relatively common experience. How can we select content? I would suggest that this phenomenon argues for the broadest possible contact with the culture, for deliberate diversity. This diversity can be achieved both through teacher planning and through students choosing their own content to explore and then sharing some part of it. Since knowledge is multimodal, such experiences should not be limited to the verbal. Images underlie much language. I suspect that if I write "polar bear," your thought is more likely to be an image of a polar bear that you have seen on TV or in a zoo than a verbal definition of polar bear or some discussion of polar bears.

If we acquire knowledge and strategies through experience, what characteristics of experience are important to consider in our classes? First, experience is complex and open. ("Ill-structured" is a term commonly used in the literature, but its negative connotations and even its denotative sense of lack of structure does not seem appropriate. Throughout the remainder of this article, I will use "complex and open" in place of "ill-structured.") The level of complexity is perhaps one of the most serious disjunctions between classroom language teaching and actual communicative situations. Students who have always functioned where there are clear answers and clear directions, where ambiguity and confusion are avoided, are unlikely to develop the strategies (cognitive and social) needed to function in complex, open environments. The need to prepare students to communicate outside of the classroom is obviously not a new point. The importance of negotiation and its connection to repair has been recognized for some time now (Schwartz, 1980; Tarone, 1980). However, highly structured information-gap activities, often seen as the way to facilitate negotiation and repair, while better than drills, still may lack a number of elements of actual communicative situations. They are not self-initiated and they are usually not particularly complex and open.

Complexity and openness either in the classroom or in course-related activities in the wider community should facilitate the development of usable knowledge. Complexity and openness may be achieved intentionally through ambiguous directions that require students to ask for clarification. It could also be achieved to some extent through deliberate variations in class routines. Most simply, it can be achieved by opening the classroom to the students' own experiences and interests. Replacing the univocal teacher-directed and teacher-controlled class with the multicultural polyvocality of ESL students quickly leads to complexities, which challenge teacher and students alike. Students may also encounter complexity and openness outside of the class. A number of current approaches to language teaching are congruent with this point. For example, using the community as a site for student tasks and as a resource for in-class activities is very valuable. Having students attend a public meeting, tour a building, go to a park, can lead to the kind of unanticipated interactions that distinguish complex, open systems from closed ones.

A second characteristic of experience is that it is particular, multimodal, and rich. Our knowledge of restaurants was not acquired through scripts, through ab-

stract discussion of restaurant events. It was acquired through experiences in restaurants, experiences that involved all of our senses, that involved our own physical interactions with the environment. As Lakoff (1987) and Johnson (1987) point out, our bodily experience of the world and our images derived from it play a central role in our thought and language, even in domains like science previously thought to be "logical and rational." Through this multimodal experience, we learn much that rapidly becomes tacit. How many of you get confused, as I do, when someone asks for a verbal explanation of how to react to sliding on the ice when driving? The tacit and physical dimensions of our knowledge struck me in an incident that occurred during a library session with an ESL student at the University of Wisconsin several years ago. After an hour long presentation on how to find books and journals, one of the students set out on an exercise. Staring at his paper, he walked out of the classroom, into the stacks. Staring at a call number on his page, he stopped and looked confused. I asked him what the problem was, and he asked how to find the number. I pointed up at the call numbers on the side of the stacks and he brightened up, "A-ha". Looking up was not one of the points we had discussed in talking about how to find books. Our cognitive map of the activity tacitly assumed much, as I would argue our cognitive maps of many things do. Carefully constructed and controlled activities in less rich environments risk missing many such particulars.

At this point an obvious question arises. If experience is so great, why should students have classes in ESL? Why not just send students directly into the environments that they need to function in? ESL classes can perform a number of valuable functions. First, these classes can encourage students to contact a broader range of experiences, including ones that successful students/competent members of the culture have already had. Part of this encouragement may come from helping students develop the language and background knowledge needed for basic access to an experience. For example, if you spend time with students on newspapers, helping them learn how papers are organized, what kinds of information are found in them, how headlines are written, and so on, it may provide students with enough knowledge (including interest) to get them over the initial barrier, where an activity seems overwhelming. Second, classes can provide an environment where ESL students can process their experiences and have permission to ask questions about both the experience and the language (something that is often not as true in the general environment, for example, in mainstream academic classes). Third, ESL classes can provide an important social and psychological support to facilitate intercultural adaptation. ESL students confronting the English-speaking culture of the school are obviously subject to culture shock. As Weaver (1986) notes, it is important to distinguish between coping mechanisms and defense mechanisms in response to culture shock. ESL classes can be a forum where awareness of culture and intercultural conflict is acknowledged and discussed, points that Weaver argues are central to coping.

Some teachers might feel uncomfortable with this list of functions, wondering how the central function of ESL, language teaching, fits in. But that is pre-

cisely the point: we cannot teach language. Language is not an isolated box in your head as many cognitive psychology texts picture it. It is not an independent set of syntactic rules and lexical items that can be developed so that later they can be plugged into another set of boxes called world knowledge, beliefs, emotions, motor programs, and finally personality. Acquiring usable knowledge for functioning in this culture, the kind of competence or proficiency we envision our students having and using in pursuit of their own goals, is something the whole person does, something that changes the whole person, and, finally, something that arises out of experiences and the processing of experience. Competent, compassionate teachers can facilitate and accelerate the learning process, can welcome students into the English-speaking club, by dealing with the concerns of the whole student in her social milieu, by opening up the classroom to the complexity of life as it is experienced.

ABSENCE, INACCESSIBILITY, AND APATHY

Based on the above discussion, inert knowledge in second language instruction can be linked to at least three sources. First is absence. Classes that do not present students with or direct them to a wide range of authentic experiences with the target language and culture may result in students with gaping holes in their competence. Second is inaccessibility. If the conditions under which the encoding of knowledge occur are too different from the conditions of retrieval, the knowledge may be inert, unavailable knowledge. One of the central factors is complexity. Since most actual communicative situations are complex and open, well-structured (i.e., oversimplified) classes, even when they are "communicative", may leave the students with inaccessible knowledge. Clearly, having students fill in the blanks with the correct forms of the following verbs will rarely result in usable knowledge. Finally, there is what I will call apathy (apathy in the sense of a lack of self-initiated goals and controls arising from instructional practices that do not facilitate self-initiation). If students do not experience self-initiated and self-directed searches for knowledge and attempts at communication, the knowledge acquired might not find its way into their personal scripts. They might not develop the strategies needed for self-initiated and self-controlled use of the knowledge and, therefore, not use it outside of the classroom. Or returning to Smith's formulation, they might develop self/social identities which exclude them from participation in some "clubs" of the culture (e.g., literacy, schooling, political affairs).

To help students develop usable knowledge, we need to have classes that are complex and open, and that direct students to other complex, open experiences. We need classes that emphasize the broadest, most varied contact with language, content, and culture that is possible. We need classes that encourage learners to be active and empowered rather than passive, by permitting them to assume active, empowered roles in the ESL classroom itself. Most fundamentally, we need

to heed Spiro et al.'s (1989) warning of the dangers of oversimplification, an oversimplification that arises in our field from overemphasizing the role of syntax in language, the role of language in communication and the role of rules in both. The knowledge we use to produce and understand discourse is all of the knowledge we acquire through experience, not just a few reified products of that experience. Our task as teachers is not to teach students the rules of our language, but rather to facilitate their learning through experience of our cultures and to create the conditions in which together we will most fully realize our human potential.

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